

**WHAT IS CLAIMED IS:**

1. A steering control apparatus for an automotive vehicle, comprising:

5 a camera photographing a travel path in a traveling direction of a vehicle;

a lateral displacement calculating circuit that calculates a lateral displacement of the vehicle with respect to the travel path according to an image of  
10 the travel path photographed by the camera;

a differentiator that calculates a differential value of the lateral displacement;

a vehicle speed sensor that detects a vehicle speed;

15 a relative yaw rate calculating section that calculates a relative yaw rate with respect to the travel path of the vehicle on the basis of the lateral displacement, the differential value of the lateral displacement, and the vehicle speed;

20 an actuator that provides an assistance force for the steering mechanism; and

an actuator controlling section that drivingly controls the actuator in a direction toward which the relative yaw rate is cancelled on the basis of the  
25 relative yaw rate.

2. A steering control apparatus for an automotive vehicle as claimed in claim 1, wherein the lateral displacement calculating circuit comprises: a white  
30 line recognition circuit that recognizes white lines located on both ends of the traveling path; a center position calculating circuit which calculates a center position between both ends of the travel path; and a deviation quantity calculating circuit that

calculates a lateral displacement of the vehicle with respect to the center position of the travel path.

3. A steering control apparatus for an automotive  
5 vehicle as claimed in claim 2, wherein the white line  
recognition circuit recognizes the white lines a  
predetermined distance ahead of the vehicle and the  
deviation quantity calculating section calculates a  
variation rate of a relative angle between the center  
10 position of the white line and the vehicle.

4. A steering control apparatus for an automotive  
vehicle as claimed in claim 1, wherein the steering  
control apparatus further comprises a steering torque  
15 sensor that detects a steering torque applied to the  
steering mechanism and the actuator controlling  
section drivingly controls the actuator on the basis  
of the relative yaw rate and the steering torque.

20 5. A steering control apparatus for an automotive  
vehicle as claimed in claim 1, wherein the  
differentiator comprises a filter processing  
circuit.

25 6. A steering control apparatus for an  
automotive vehicle as claimed in claim 1, wherein  
the actuator controlling section outputs a  
steering torque command value to the actuator,  
the steering torque command value being a sum of  
30 a steering assistance quantity calculated on the  
basis of a steering torque and the vehicle speed  
and a stability direction steering quantity

calculated on the basis of the calculated relative yaw rate.

7. A steering control apparatus for an  
5 automotive vehicle as claimed in claim 6, wherein  
the actuator controlling section comprises a  
relative yaw rate controlling section comprising:  
a differentiator that differentiates the lateral  
displacement; a pseudo differentiation filter  
10 constituted by a predetermined forward distance  
(L) and the vehicle speed; and a control gain  
section that provides a control gain in the  
direction toward which the relative yaw rate  
extracted from the pseudo differentiation filter  
15 is cancelled and outputs the stability direction  
steering quantity.

8. A steering control apparatus for an  
automotive vehicle as claimed in claim 7, wherein  
20 the actuator controlling section comprises a  
steering assistance controlling section that  
calculates the steering assistance quantity on  
the basis of a steering torque and the vehicle  
speed.

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9. A steering control apparatus for an  
automotive vehicle as claimed in claim 8, wherein  
the actuator comprises an electrically driven  
motor of a power steering mechanism of the  
30 vehicle.

10. A steering control method for an automotive  
vehicle, comprising:

photographing a travel path in a traveling  
direction of a vehicle using a camera;

calculating a lateral displacement of the  
vehicle with respect to the travel path according to  
5 an image of the travel path photographed by the  
camera;

calculating a differential value of the lateral  
displacement;

detecting a vehicle speed;

10 calculating a relative yaw rate with respect to  
the travel path of the vehicle on the basis of the  
lateral displacement, the differential value of the  
lateral displacement, and the vehicle speed;

providing a steering assistance force for the  
15 steering mechanism using an actuator; and

drivingly controlling the actuator in a  
direction toward which the relative yaw rate is  
cancelled on the basis of the relative yaw rate.

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